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(54) Method for positioning an ink cartridge, and the ink cartridge and ink jet recording apparatus used for such method

(57) A method for positioning a cartridge by allowing the fitting portion of the ink cartridge to engage with the ink supply tube supporting portion of the ink cartridge housing when the ink cartridge is mounted on the ink cartridge housing includes the steps of positioning the ink supply tube and the ink cartridge fitting portion by guiding the ink cartridge by means of the engagement between the ink cartridge housing member and the ink cartridge until the fitting portion of the ink cartridge and the supporting portion of the ink supply tube begin to engage with each other; and completing the mounting of the ink cartridge on the ink cartridge housing member

by loosening at least partly the engagement between the ink cartridge housing member and the ink cartridge after the engagement is made between the fitting portion of the ink cartridge and the supporting portion of the ink supply tube. With such structure, the operativity of the method is enhanced, while positioning the supply tube and the fitting portion of the ink cartridge in high precision. Further, no load is given to the supply tube and the supply tube supporting portion after the completion of its engagement.

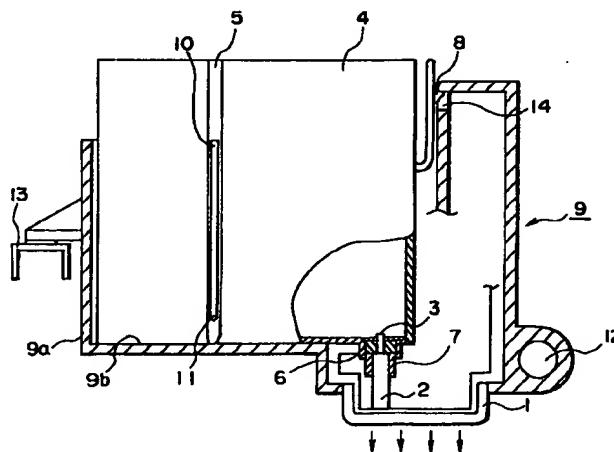


FIG. 1

Description**BACKGROUND OF THE INVENTION****Field of the Invention**

The present invention relates to a method for positioning an ink cartridge when the ink cartridge is mounted on an ink jet recording apparatus, and the ink cartridge and ink jet recording apparatus used for such method.

Related Background Art

Regarding the structures whereby to position a detachably mountable ink cartridge in a given position for an ink jet recording apparatus, there have been known the ones such as disclosed in Japanese Patent Laid-Open Application No. 63-15752 and Japanese Patent Laid-Open Application No. 59-12855.

Fig. 6 is a view which schematically shows a structure for positioning an ink cartridge according to the prior art disclosed in the Japanese Patent Laid-Open Application No. 63-15752. Fig. 7 is a view which schematically shows a structure for positioning an ink cartridge according to the prior art disclosed in the Japanese Patent Laid-Open Application No. 59-12855.

The structure for positioning the ink cartridge shown in Fig. 6 is arranged to supply ink from each ink supply port 65 of the cartridge case 63 through the plug of each ink cartridge 61. Here, the positioning pin 62 provided for each ink cartridge 61 is inserted along each positioning groove 64 arranged for the cartridge case 63. Then, while positioning the needles 66 of the cartridge case 63 at the plug of the ink cartridge 61, the needle 66 is penetrated through into the plug.

The structure for positioning the ink cartridge shown in Fig. 7 is arranged so as to allow the ink cartridge 71 to be inserted for fitting it over a supply tube 73 to supply ink into an ink tank 72, thus positioning the ink cartridge 71 and also, preventing ink leakage from the ink cartridge 71.

However, the following problems are encountered in positioning the ink cartridge according to the prior art.

The pointed end of the needle that conducts ink retained in the ink cartridge into an ink jet head is acute and dangerous according to the prior art disclosed in Japanese Patent Laid-Open Application No. 63-15752. To counteract this, it may be possible to adopt a tube like a pipe whose pointed end is not so acute as that of the needle. In order to make it easy for such tube to penetrate the plug of the ink cartridge, a prepared hole may be provided for the plug. Even if such a countermeasure should be taken, it is not easy to let the tube penetrate the plug or, in some cases, it becomes impossible to let it penetrate the plug should there be any misregistration between the prepared hole of the plug and the tube.

Also, for the prior art disclosed in Japanese Patent Laid-Open Application No. 59-12855, only an ink supply

tube is prepared for supplying ink to an ink tank when the ink cartridge is mounted. As a result, the fitting portion arranged for mounting the ink cartridge is under the so-called shadow of one's own hand, making it difficult to perform the required mounting operation. To counteract this, it is conceivable that a guiding portion is arranged on the periphery of the ink cartridge or the like so that the ink cartridge is guided to the fitting portion arranged for the cartridge to be mounted exactly at the end.

However, with such structure arranged as above, it is required to enhance the precision of processing dimensions of the ink cartridge considerably in addition to the provision of the guiding portion to fit the ink cartridge with the ink supply tube assuredly. Therefore, the fitting portion of the ink cartridge is rigidly restricted even after the ink cartridge and ink supply tube are positioned by fitting them together. This restriction may lead to exerting a load on the supporting portion of the ink supply tube or the like. Therefore, this arrangement is not preferable if a frequent exchange of ink cartridges should be taken into account. Meanwhile, it is possible to avoid such exertion of load as described above if the gap between the guide portion and ink cartridge is made larger, for example. This may also ease the required precision of the processing dimensions. In this case, however, the ink cartridge cannot be guided assuredly to the portion where it is fitted finally, thus making it difficult to execute any exact fitting after all. Moreover, if the posture of the ink cartridge is tilted by the hand of operator or the like when mounting it, the larger gap allows it to be inclined easily, leading to the exertion of a load to the supply tube or the supporting portion of the supply tube eventually.

SUMMARY OF THE INVENTION

The present invention is designed with a view to solving the problems of the prior art described above. It is an object of the invention to provide a method for positioning an ink cartridge while being mounted, which is capable of guiding the ink cartridge in good precision until the fitting begins between the ink cartridge and ink supply tube, but giving no load to the supply tube, the supply tube supporting portion, and the like, after the fitting is once completed, and also to provide the ink cartridge and ink jet recording apparatus used for such method.

It is another object of the invention to provide a method for positioning an ink cartridge, being capable of positioning the ink supply tube and ink cartridge in high precision by guiding a given ink cartridge housing member and the ink cartridge without any looseness in the engagement between them to the location where the ink cartridge fitting portion and ink supply tube supporting portion begin to engage with each other, and at the same time, releasing the engagement between the given housing member and ink cartridge after fitting so that the ink cartridge is not restricted by the ink supply

tube supporting portion once the ink cartridge has been mounted completely on the given housing member, thus reducing the load to be exerted on the supply tube supporting portion, and also, to provide the ink cartridge and ink jet recording apparatus used for such method.

It is still another object of the invention to provide a method for positioning a cartridge by allowing the ink cartridge fitting portion to engage with the ink supply tube supporting portion of the ink cartridge housing when the ink cartridge is mounted on the housing, including the following steps of:

positioning the ink supply tube and the ink cartridge fitting portion by guiding the ink cartridge by means of the engagement between the ink cartridge housing member and the ink cartridge until the ink cartridge fitting portion and the ink supply tube supporting portion begin to engage with each other; and

completing the mounting of the ink cartridge on the ink cartridge housing member by releasing at least partly the engagement between the ink cartridge housing member and the ink cartridge after the engagement is made between the ink cartridge fitting portion and the ink tube supporting portion.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a view which schematically shows a first embodiment of the structure for positioning an ink cartridge of an ink jet recording apparatus in accordance with the present invention.

Figs. 2A to 2C are views which illustrate the mounting process and method of an ink jet cartridge in accordance with the first embodiment of the present invention.

Fig. 3 is a view which schematically shows a second embodiment of the structure for positioning an ink cartridge of an ink jet recording apparatus in accordance with the present invention.

Fig. 4 is an enlarged section of the circumference of the supply tube of a third embodiment of the structure for positioning an ink cartridge of an ink jet recording apparatus in accordance with the present invention.

Fig. 5 is a perspective view which shows the fitting portion of an ink cartridge of a fourth embodiment of the structure for positioning an ink cartridge of an ink jet recording apparatus in accordance with the present invention.

Fig. 6 is a perspective view which schematically shows the structure for positioning an ink cartridge in accordance with the prior art.

Fig. 7 is a view which schematically shows another example of the structure for positioning an ink cartridge in accordance with the prior-art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, with reference to the accompanying drawings, the description will be made of the embodiments in accordance with the present invention.

(First Embodiment)

Fig. 1 is a view which schematically shows a first embodiment of the structure for positioning an ink cartridge of an ink jet recording apparatus in accordance with the present invention, and which shows the state of the ink cartridge when it is mounted.

The ink jet recording apparatus, which is provided with the structure for positioning an ink cartridge in accordance with the present embodiment, comprises a carriage 9 which causes a given housing member 9a having an ink jet recording head 1 being mounted on it to serially travel along the recording area as shown in Fig. 1. Here, the housing member 9a is a member provided with a surface 9b where an ink cartridge is mounted. The housing member is arranged integrally with the carriage 9, but it may be arranged separately as a member detachably mountable on the carriage 9. For the present embodiment, the description will be made of the housing member 9a that is formed integrally with the carriage 9. The one end of the carriage 9 is made slideable on a sliding shaft 12, which is rotatively fitted over the sliding shaft 12. The other end thereof engages with a guide 13. Also, the carriage 9 engages with a part of a timing belt (not shown), and is arranged to reciprocate along the sliding shaft 12 when the timing belt is driven by a motor (not shown). During its reciprocation, the ink jet recording apparatus forms printed images by discharging ink from the ink jet recording head 1 in accordance with a given timing. In this respect, the ink jet recording head 1 is provided with electrothermal transducing elements (which transduce electric energy to thermal energy) or electromechanical transducing elements (which transduce electric energy to mechanical displacement) in order to generate energy for discharging ink from the ink discharge ports.

Further, the cartridge housing member 9a is such that an ink cartridge 4 that can retain ink in it is detachably mountable. The supply tube 3 that guides ink in the ink cartridge 4 into an ink jet recording head 1 is arranged to extrude vertically by means of the supporting portion 2 of the supply tube. Also, the supply tube 3 and the supply tube supporting portion 2 are not only in such a mode that these are fixed directly to the cartridge housing member 9a, but may also be in such a mode that the supply tube 3 and supply tube supporting portion 2 are installed on another member, that is, an ink jet recording head 1, for instance, and then, the ink cartridge 4 is housed by the cartridge housing member 9a after this ink jet recording head 1 is positioned and installed on the cartridge housing member 9a. It should be good enough if only the supply tube 3 and supply tube supporting portion 2 are located so as to allow them to engage at least with the ink cartridge 4 with respect to the cartridge housing member 9a.

On the side end of the ink cartridge 4, there is formed a grooved guided portion 5. On the cartridge housing member 9a, a guiding portion 10 is arranged with a tapered portion 11, which is tapered on the ink

cartridge mounting surface 9b side. The guided portion 5 of the ink cartridge 4 can be inserted into the guiding portion 10. Only the groove width of the guide portion 5 on the bottom side of the ink cartridge 4 is set so that it does not present any looseness when the guided portion 5 and guiding portion 10 engage with each other. For the present embodiment, the guided portion 5 is provided for the ink cartridge 4, while the guiding portion 10 is provided for the carriage 9, but it should be good enough if only the guiding means that comprises a grooved guided portion and a guiding portion that can be inserted into it is arranged relatively with respect to the ink cartridge 4 and cartridge housing member 9a. In other words, it may be possible to arrange the grooved guided portion for the cartridge housing member 9a, while the guiding portion that can be inserted into the guided portion is arranged for the ink cartridge 4. Also, the positioning is made in a higher precision if a plurality of locations are arranged for the guided and guiding portions to engage with each other.

Also, in the ink cartridge 4, an elastic plug 6 is incorporated with a prepared hole being formed for the plug by use of a needle or the like. In the interior of the ink cartridge 4, ink is retained airtightly by means of the plug 6. It may also be possible to use the ink cartridge 4 retaining ink airtightly in it by means of the plug 6 arranged to be easily provided with a through hole when the pointed end of the supply tube 3 is pressed to the plug. On the circumference of the plug 6, an ink cartridge fitting portion 7 is arranged to allow the supply tube supporting portion 2 to be fitted after the ink cartridge 4 has been guided along the guide portion 10.

For the ink cartridge 4, a stopper 8 is arranged to hold the ink cartridge 4 in the carriage 9, which is hooked to an aperture 14 formed on the carriage 9 for this hooking use. For the present embodiment, a plurality of ink cartridges 4 (for use of yellow, magenta, cyan, and black ink) are arranged to be mountable on the carriage 9.

Now, the description will be made of the process in which the ink cartridge 4 and supply tube 3 are being positioned.

Figs. 2A to 2C illustrate the process and method of installation of an ink cartridge in accordance with the first embodiment of the present invention.

The user inserts the guided portion 5 of the ink cartridge into the guiding portion 10 of the cartridge housing member 9a, and presses the ink cartridge 4 along the guiding portion 10 onto the cartridge installation surface 9b side of the cartridge housing member 9a.

Then, as shown in Fig. 2A, the supply tube 3 is in a state that it is located in the space of the ink cartridge fitting portion 7. At this juncture, the plug 6 of the ink cartridge 4 is yet to reach the supply tube 3. The guided portion 5 is in a state that it engages with the guiding portion 10 without any looseness.

When the ink cartridge 4 is further pressed downward in Figs. 2A to 2C (toward the cartridge installation surface 9b side) from the state shown in Fig. 2A, the

5 pointed end of the fitting portion 7 of the ink cartridge 4 reaches the pointed end of the supply tube supporting portion 2 as shown in Fig. 2B, that is, the engagement begins to be made between the ink cartridge fitting portion 7 and the supply tube supporting portion 2 in such state as described above. At this juncture, since the tapered portion 11 is arranged for the guiding portion 10 on the bottom side of the cartridge housing member 9a, the guided portion 5 and guiding portion 10 tend to begin releasing the engagement between them. Also, in the state shown in Fig. 2B, the plug 6 is yet to reach the supply tube 3. Here, however, the plug 6 may be allowed to reach the supply tube 3.

10 When the ink cartridge 4 is pressed downward further still, the ink cartridge fitting portion 7 and the supply tube supporting portion 3 are inserted by fitting as shown in Fig. 2C. In this state, the engagement between the guided portion 5 and guiding portion 10 is completely loose.

15 20 Thereafter, the plug 6 reaches the supply tube 3 when the ink cartridge 4 is completely mounted on the cartridge installation surface of the carriage. Thus the supply tube 3 penetrates the plug 6 or the prepared hole thereof. The stopper 8 shown in Fig. 1 is hooked to the aperture 14 for use of hooking, and the installation of the ink cartridge 4 is completed.

25 30 As described above, at the state that the pointed end of the ink cartridge fitting portion 7 of the ink cartridge 4 reaches the pointed end of the supply tube supporting portion 2, that is, the state where the engagement between the ink cartridge fitting portion 7 and supply tube supporting portion 2 begins, the engagement between the guide portion 5 and guiding portion 10 begins to be loose. Therefore, even after the installation of the ink cartridge 4, there is no restriction imposed upon the ink cartridge 4 by the guiding portion 10.

35 40 45 As a result, it is possible to install the ink cartridge 4 smoothly. Also, there is no load given to the supply tube supporting portion 2 after the ink cartridge 4 has been installed. Particularly, for the structure where the supply tube supporting portion 2 is installed directly on the ink jet recording head, it is possible to minimize adverse effects on the supply tube supporting portion 2 and inner liquid path of the ink jet recording head, as well as on the slanted posture of the facing plane of the ink jet recording head 1, thus obtaining clearly printed images reliably.

50 55 Also, the stopper 8 integrally formed with the ink cartridge 4 is elastic, and abuts upon the portion near the aperture 14 for use of hooking before the stopper 8 hooks to this aperture 12 when the ink cartridge is being pressed. Therefore, its elastic force tends to act in the direction that the ink cartridge 4 is being pressed to the guiding portion 10. Under such circumstances, there is a possibility that this force works to hinder the fitting and insertion of the ink cartridge fitting portion 7 and supply tube supporting portion 2 on the moment that the

engagement between the guided portion 5 and guiding portion 10 is released.

Therefore, the position where the elasticity of the stopper 8 begins to act is arranged to be set in a location after the ink cartridge fitting portion 7 and the supply tube supporting portion engage with each other. In this way, it becomes possible to implement positioning more accurately, while improving its operativity.

(Second Embodiment)

Fig. 3 is a view which schematically shows a second embodiment of the structure for positioning an ink cartridge of an ink jet recording apparatus in accordance with the present invention.

As shown in Fig. 3, the present embodiment is an example of such a structure that an ink cartridge 24 is installed in a cartridge case 33, that is, a member for housing the ink cartridge 24, and then, ink retained in the ink cartridge 24 is supplied to an ink tank 34 of an ink jet recording head 24 through a tube 35.

As in the first embodiment, one end of the carriage 28 is slidable on a sliding shaft 31, and is rotatively inserted to fit it over the sliding shaft 31. The other end thereof engages with a guide 32. Also, the carriage 9 partly engages with a timing belt (not shown), and can reciprocate along the sliding shaft 31 when the timing belt is driven by a motor (not shown). During this reciprocation, the ink jet recording apparatus forms printed images by discharging ink from its ink jet recording head 21 at given timing.

The other end of the tube 35, opposite to the one end connected to the ink tank 34, is connected to the supply tube supporting portion 22 of the supply tube 23 arranged at the deep end of the cartridge case 33. Also, it is arranged that the circumference of the supply tube 23 is surrounded by a larger wall 36 than the supply tube 23. In this way, the ink cartridge fitting portion 27 and wall 36 are fitted together.

Also, for the cartridge case 33, a pair of guiding portions 29 are arranged up and down when observing the cartridge case on Fig. 3. On the ink cartridge 24 side, grooved guided portions 25 are arranged corresponding to the guiding portions 20, respectively.

In accordance with the present embodiment, the supply tube 23 is covered by the wall 36, and it cannot be touched by hand. Therefore, this structure does not allow any dust particles to adhere to the supply tube or there is no possibility that any excessive force is exerted thereon.

Now, with reference to Fig. 3, the description will be made of the process and method of positioning the ink cartridge 24 and supply tube 23.

The user inserts the guided portion 25 of the ink cartridge 24 into the guiding portion 29 of the cartridge case 33, and presses the ink cartridge 24 to the deep side of the cartridge case 33 along the guiding portion 29.

Then, the pointed end of the ink cartridge fitting portion 27 reaches the pointed end of the supply tube 23. In other words, the fitting portion 27 of the ink cartridge and the wall 36 begin to engage with each other. At this juncture, since a tapered portion 30 is arranged for one end of the guiding portion 29 on the deep side of the cartridge case 33, the engagement between the guided portion 25 and guiding portion 29 tend to begin being released. Also, even in this state, the plug 26 is yet to reach the supply tube 23.

When the ink cartridge 24 is further pressed to the deep side, the ink cartridge fitting portion 27 and wall 36 engage with each other. In this state, the engagement between the guided portion 25 and guiding portion 29 is completely released. Therefore, the ink cartridge 24 is not restricted rigidly by the guiding portion 29 on the deep side portion of the cartridge case 33.

Thereafter, when the ink cartridge 24 is further pressed, the plug 26 reaches the supply tube 23, and then, the supply tube 23 penetrates the plug 26 or the prepared hole of the plug 26. Thus the installation of the ink cartridge 24 is completed.

(Third Embodiment)

The present embodiment is of such a structure as to implement a further reduction of the load given to the supply tube described in the second embodiment.

Fig. 4 is an enlarged section of the circumference of a supply tube in accordance with a third embodiment of the structure for positioning an ink cartridge of an ink jet recording apparatus of the present invention. In Fig. 4, the same reference marks are applied to the same constituents appearing in Fig. 3. For the present embodiment, the description of any portions that are overlapped with those of the second embodiment will be omitted.

In Fig. 4, extrusions 38 are formed on both faces of a plug 26a in order to provide a good sealing performance, and on the leading end side of the ink cartridge fitting portion 27, a slanted face 37 is formed for the prepared hole of the plug 26a. Also, the plug 26a is incorporated in the ink cartridge 24 with the provision of gaps 39. As a result, it is easy for the plug to move in the direction indicated arrows.

As described above, since the plug 26a can easily move in the directions indicated by arrows even after it has been incorporated in the ink cartridge 24, the plug 26a can shift with respect to the supply tube 23 by the functions of the slanted faces 37 and gaps 39 during the process in which the ink cartridge fitting portion 27 and wall 36 are allowed to engage and to be inserted. As a result, no load is given to the supply tube 23 and the prepared hole of the plug 26a, thus making it possible to perform positioning more accurately. Also, there is no possibility to invite any causes to lower its operativity.

(Fourth Embodiment)

Fig. 5 is a view which shows an ink cartridge fitting portion 47 in accordance with a fourth embodiment of the structure for positioning an ink cartridge of an ink jet recording apparatus of the present invention.

The present embodiment is such that as shown in Fig. 5, cut-off portions 41 are provided for the ink cartridge fitting portion 47 referred to in the first and second embodiments, and then, elasticity is given to this portion as a fitting piece 40. With such structure, it is possible to implement a further reduction of the load given to the supply tube supporting portion and the ink jet recording head described in the first and second embodiments.

Now, as each of the embodiments are structured as described above, it is possible to obtain the following effects:

(1) When an ink cartridge is being installed on a given housing member in order to connect the ink cartridge and ink jet recording head through a supply tube, the ink cartridge is guided by use of guiding means, and at the same time, the ink cartridge fitting portion, which is arranged in the vicinity of the plug to be used for sealing ink in the ink cartridge, is allowed to engage with the extruded supporting portion of the supply tube arranged for the given housing member or with the wall surrounding the extruded supply tube on the deep side of the given housing member. With the structure thus arranged, it is possible to position the supply tube and the plug or the prepared hole of the plug in high precision, while implementing the improvement of its operativity.

(2) Guiding means is structured to release the engagement between an ink cartridge and a given housing member, which has been made without any looseness until when the ink cartridge fitting portion and the supply tube supporting portion reach a location where these portions begin to engage with each other during the process in which the ink cartridge is installed. In this way, it is possible to minimize causing damage to the supply tube supporting portion even in a frequent attachment and detachment of the ink cartridge. Particularly, for the structure where the supply tube supporting portion is incorporated directly in an ink jet recording head, it is possible to minimize any adverse effects on the inner liquid path of the ink jet recording head and the slanted posture of facing plate of the ink jet recording head, hence obtaining clearly printed images reliably.

(3) An elastic stopper is provided for an ink cartridge, but the position where the elasticity of the stopper of the ink cartridge begins to act is set at a location after the engagement has been made between the ink cartridge fitting portion and the supply tube supporting portion. In this way, it is possible to enhance the operativity still more.

(4) Cut-off portions are provided for an ink cartridge fitting portion to provide it with elasticity, hence making it possible to reduce any load given to the supply tube supporting portion and others.

A method for positioning a cartridge by allowing the fitting portion of the ink cartridge to engage with the ink supply tube supporting portion of the ink cartridge housing when the ink cartridge is mounted on the ink cartridge housing includes the steps of positioning the ink supply tube and the ink cartridge fitting portion by guiding the ink cartridge by means of the engagement between the ink cartridge housing member and the ink cartridge until the fitting portion of the ink cartridge and the supporting portion of the ink supply tube begin to engage with each other; and completing the mounting of the ink cartridge on the ink cartridge housing member by loosening at least partly the engagement between the ink cartridge housing member and the ink cartridge after the engagement is made between the fitting portion of the ink cartridge and the supporting portion of the ink supply tube. With such structure, the operativity of the method is enhanced, while positioning the supply tube and the fitting portion of the ink cartridge in high precision. Further, no load is given to the supply tube and the supply tube supporting portion after the completion of its engagement.

Claims

1. A method for positioning a cartridge by allowing the ink cartridge fitting portion to engage with the ink supply tube supporting portion of the ink cartridge housing when said ink cartridge is mounted on said ink cartridge housing, including the following steps of:
 positioning said ink supply tube and said ink cartridge fitting portion by guiding said ink cartridge by means of the engagement between said ink cartridge housing member and said ink cartridge until the fitting portion of said ink cartridge and the supporting portion of said ink supply tube begin to engage with each other; and
 completing the mounting of said ink cartridge on said ink cartridge housing member by releasing at least partly the engagement between said ink cartridge housing member and said ink cartridge after the engagement is made between the fitting portion of said ink cartridge and the supporting portion of said ink supply tube.
2. A method for positioning a cartridge according to Claim 1, wherein said positioning step is to make the engagement between said ink cartridge housing member and said ink cartridge without any looseness, and guide said ink cartridge to position said ink supply tube and the fitting portion of said ink cartridge in high precision.

3. A method for positioning a cartridge according to Claim 1, wherein said mounting completion step is to loosen the engagement between said ink cartridge housing member and said ink cartridge, and guide said ink cartridge to completely mount said ink cartridge on said ink cartridge housing member without causing said ink cartridge to be restricted by the supporting portion of said ink supply tube.

4. A method for positioning a cartridge according to Claim 1, wherein said ink cartridge housing member is provided for an ink jet recording apparatus to record by use of an ink jet head for discharging ink.

5. A method for positioning a cartridge according to Claim 4, wherein said ink cartridge housing member is arranged for a carriage traveling serially in the recording area.

6. A method for positioning a cartridge according to Claim 4, wherein said ink jet recording head is provided with electrothermal transducing elements to generate energy for discharging ink.

7. An ink jet recording apparatus to record on a recording medium by use of an ink jet head, including the following:

- a cartridge housing member for housing an ink cartridge to store ink to be supplied to said ink jet head;
- an ink supply tube positioned to be able to engage with the fitting portion of said ink cartridge with respect to said ink cartridge member in order to supply ink in said ink cartridge to said ink jet head;
- a supply tube supporting portion located in said ink cartridge housing member in order to support said ink supply tube;
- a cartridge installation surface to mount said ink cartridge thereon when said ink cartridge is housed in said cartridge housing member; and
- a guiding member arranged for said cartridge housing member to guide said ink cartridge by engaging therewith when said ink cartridge is guided to said cartridge installation surface, said guiding member comprising a first guiding member to engage with said ink cartridge at the early stage of guiding, and a second guiding member whose engagement with said ink cartridge is released at least partly at the terminating stage of guiding.

8. An ink jet recording apparatus according to Claim 7, wherein said first guiding member is to guide said ink cartridge by making the engagement between said ink cartridge housing member and said ink cartridge without any looseness in order to position said ink supply tube and the fitting portion of said ink cartridge in high precision.

5 9. An ink jet recording apparatus according to Claim 8, wherein said second guiding member is to guide said ink cartridge by loosening the engagement between said ink cartridge housing member and said ink cartridge, and mount said ink cartridge in said ink cartridge housing member in a state where the ink cartridge is not restricted by said supply tube supporting portion.

10 10. An ink jet recording apparatus according to Claim 9, wherein said second guiding member is provided with a tapering configuration in order to release its engagement with said ink cartridge.

15 11. An ink jet recording apparatus according to Claim 8, wherein said ink cartridge housing member is arranged for a carriage traveling serially in the recording area.

20 12. An ink jet recording apparatus according to Claim 8, wherein said ink jet head is provided with electro-thermal transducing elements to generate energy for discharging ink.

25 13. An ink cartridge for storing ink to be supplied to an ink jet head, being housed in the cartridge housing member of an ink jet recording apparatus to record on a recording medium by use of said ink jet recording head, here an ink supply tube, the supply tube supporting portion to support said ink supply tube, and the cartridge installation surface being located in said cartridge housing member, including the following:

30 a fitting portion to engage with said ink supply tube for supplying ink in said ink cartridge to said ink jet head; and

35 a guiding member for guiding said ink cartridge by engaging therewith when said ink cartridge is guided to said cartridge installation surface, said guiding member comprising a first guiding member to engage with said ink cartridge at the early stage of guiding, and a second guiding member whose engagement with said ink cartridge is released at least partly at the terminating stage of guiding.

40 14. An ink cartridge according to Claim 13, wherein said first guiding member is to guide said ink cartridge by making the engagement between said ink cartridge housing member and said ink cartridge without any looseness in order to position said ink supply tube and the fitting portion of said ink cartridge in high precision.

45 15. An ink cartridge according to Claim 13, wherein said second guiding member is to guide said ink cartridge by loosening the engagement between said ink cartridge housing member and said ink cartridge, and mount said ink cartridge in said ink car-

tridge housing member in a state where the ink cartridge is not restricted by said supply tube supporting portion.

16. An ink cartridge according to Claim 13, wherein
said second guiding member is provided with a
tapering configuration in order to release its
engagement with said ink cartridge. 5

17. An ink cartridge according to Claim 13, wherein
said ink cartridge housing member is arranged for a
carriage traveling serially in the recording area. 10

18. An ink cartridge according to Claim 13, wherein
said ink jet head is provided with electrothermal
transducing elements to generate energy for dis-
charging ink. 15

19. An ink jet recording apparatus provided with an ink
cartridge detachably mountable in a given housing
member, said ink cartridge storing ink closely
sealed therein by an elastic plug having a prepared
hole; a supply tube arranged for said housing mem-
ber for supplying ink in said ink cartridge to an ink
jet recording head; and a supply tube supporting
portion to support said supply tube, including the
following: 20

guiding means for guiding said ink cartridge
to the interior of said given housing member, said
means being arranged relatively with respect to
said given housing member and said ink cartridge;
and 30

an ink cartridge fitting portion being
arranged in the vicinity of the plug of said ink car-
tridge to engage with said supply tube supporting
portion during the process of said ink cartridge
being mounted in the interior of said given housing
member by use of said guiding means, and to per-
form the positioning of said supplying tube and the
prepared hole of said plug. 35

20. An ink jet recording apparatus according to Claim
19, wherein said guiding means is structured to
release the engagement between said given hous-
ing member and said ink cartridge when the
pointed end of said ink cartridge fitting portion
reaches the pointed end of said supply tube sup-
porting portion during the process of said ink car-
tridge being mounted in said given housing
member, said engagement being made without any
looseness until at that time. 45 50

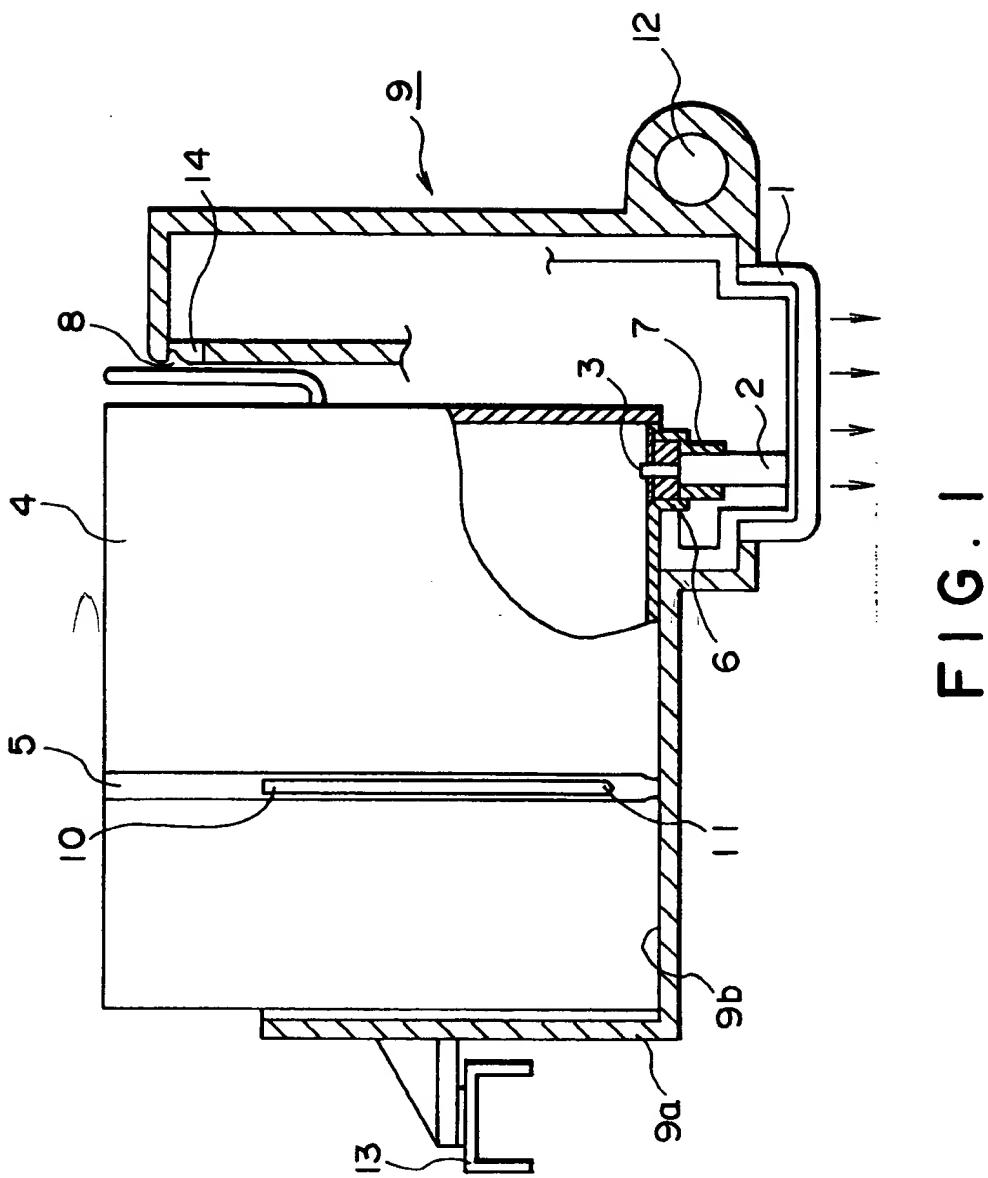
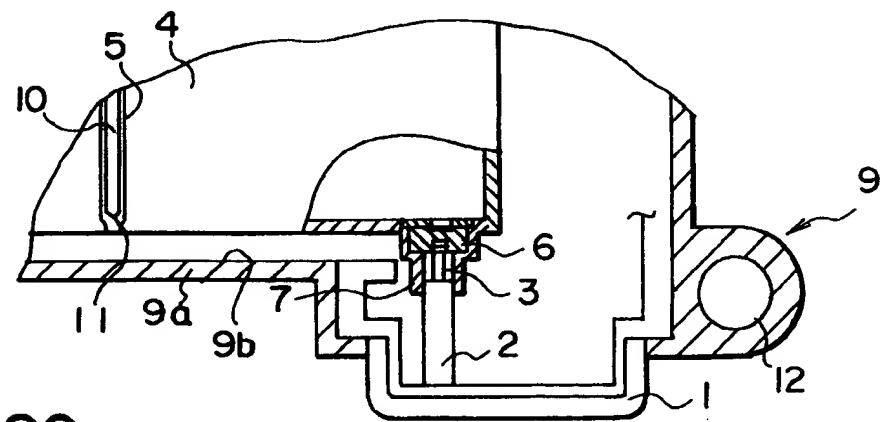
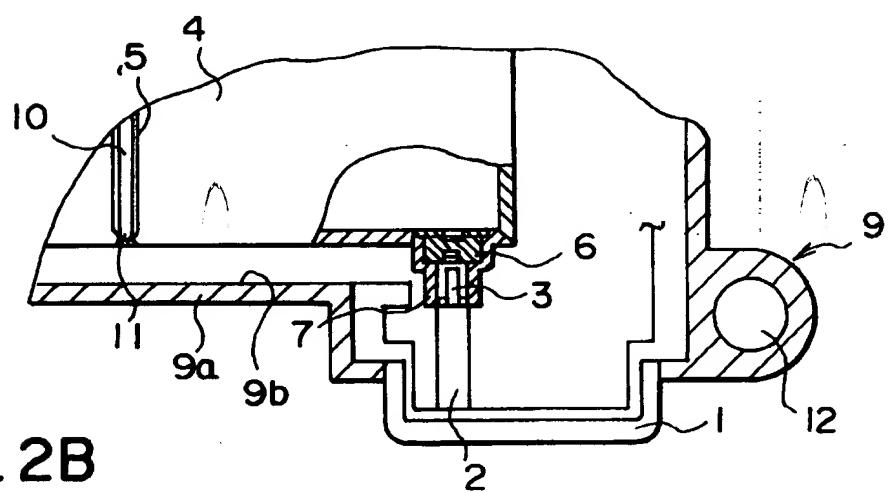
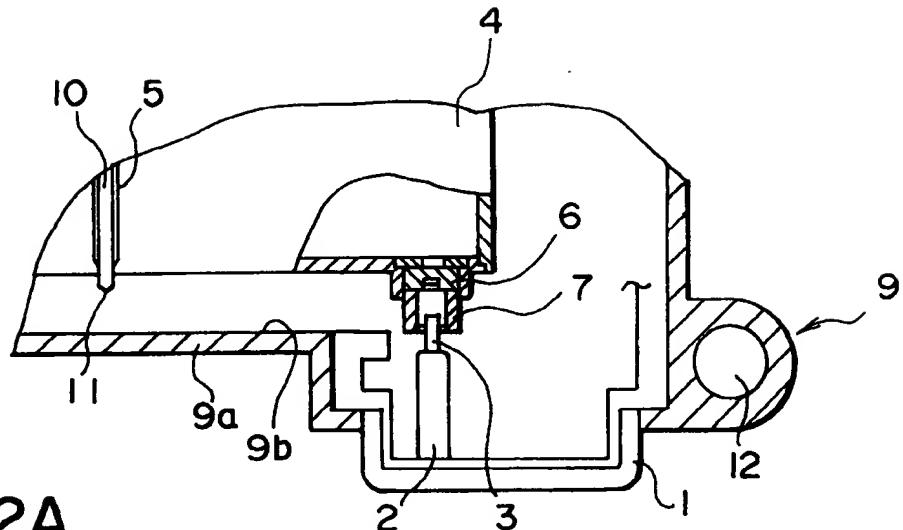


FIG. I



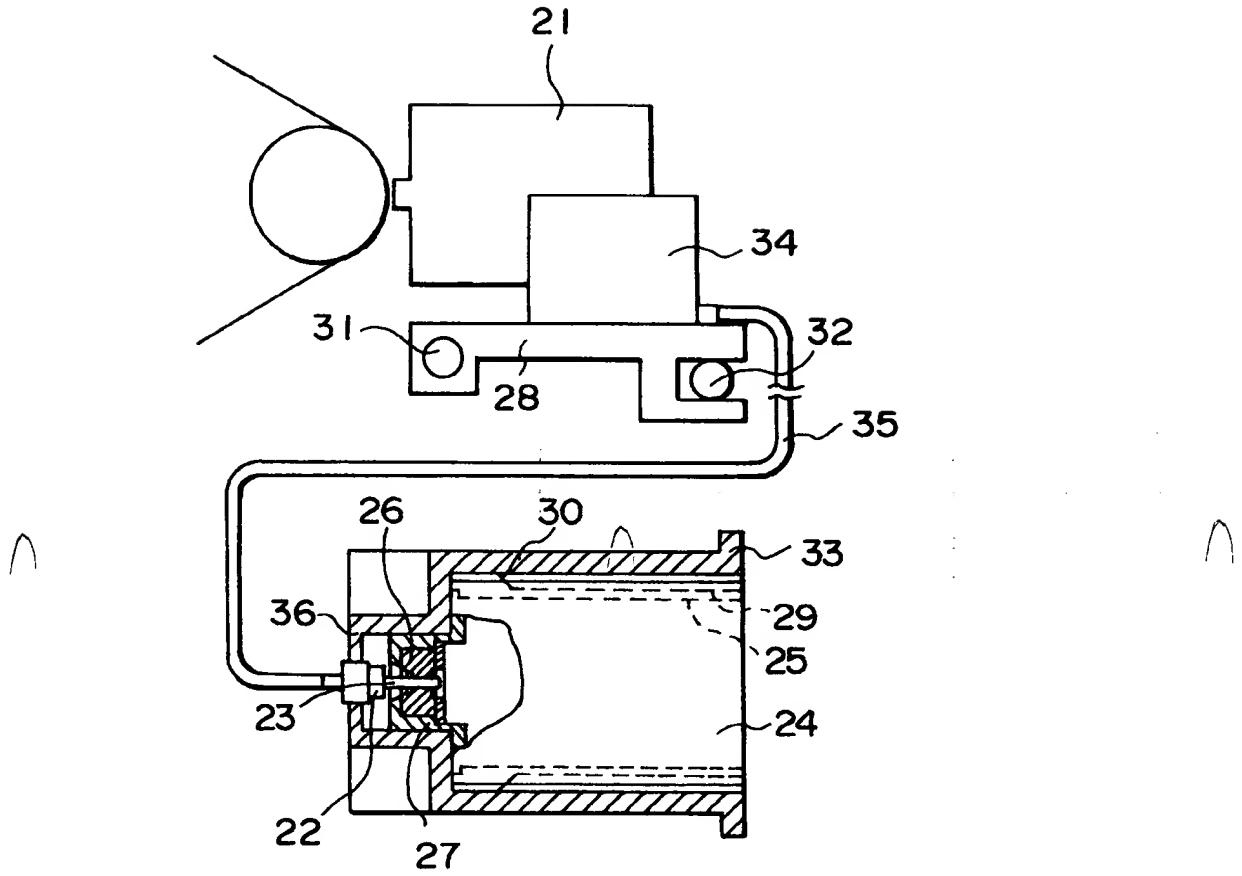


FIG. 3

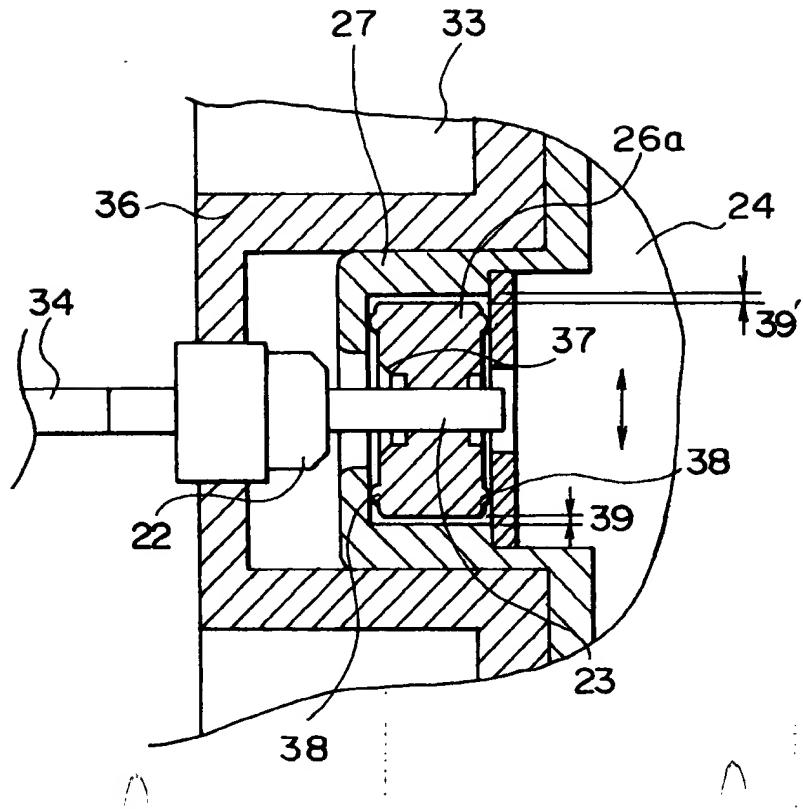


FIG. 4

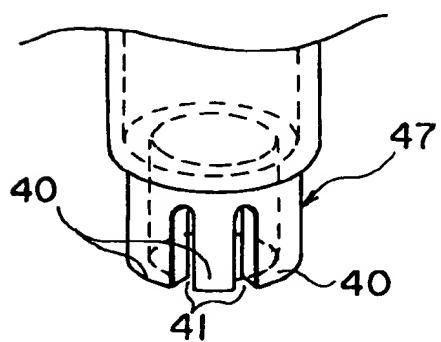
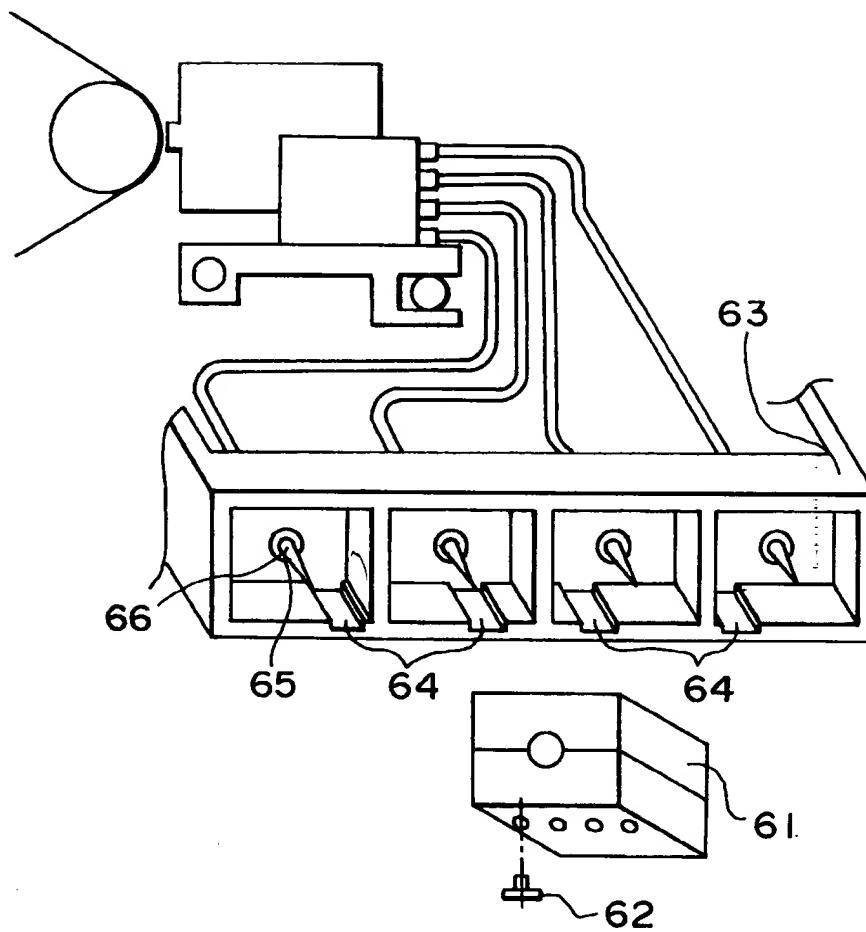


FIG. 5



F I G . 6

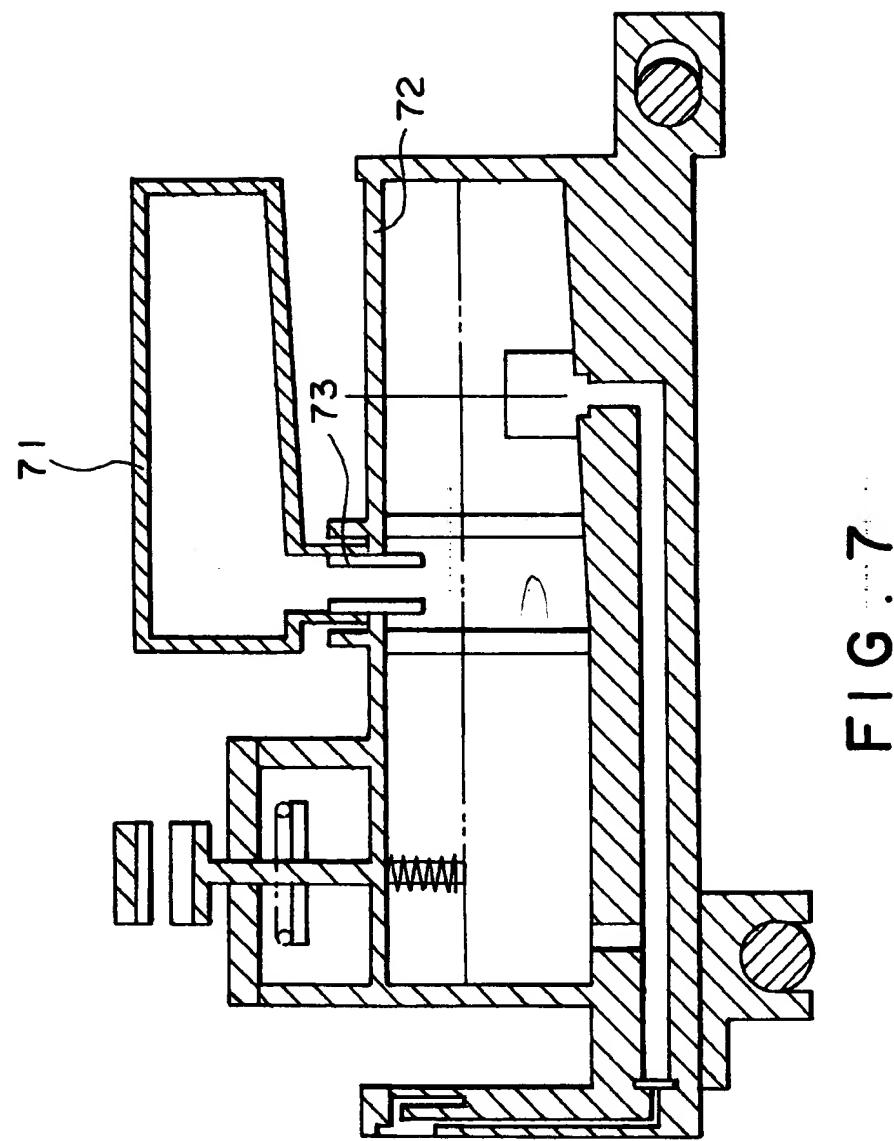


FIG. 7